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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/924,546	08/09/2001	Toshiaki Takase	Q65791	1990
<div>7590 06/01/2007 SUGHRUE, MION, ZINN, MACPEAK &amp; SEAS, PLLC 2100 Pennsylvania Avenue, N.W. Washington, DC 20037-3213</div>			<div>EXAMINER JUSKA, CHERYL ANN</div>	
			<div>ART UNIT 1771</div>	<div>PAPER NUMBER</div>
			<div>MAIL DATE 06/01/2007</div>	<div>DELIVERY MODE PAPER</div>

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

# Office Action Summary

Application No.

09/924,546

Applicant(s)

TAKASE ET AL.

Examiner

Cheryl Juska

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 09 March 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 45-72 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 45-72 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
  - 2) ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Amendment***

1. Applicant's amendment filed February 12, 2007, has been entered. Claims 1-44 have been cancelled and new claims 45-72 have been added. Additionally, applicant's supplemental amendment filed March 9, 2007, has been entered. Claims 64-66 have been amended as requested. Thus, the pending claims are 45-72.
2. The cancellation of claims 1-44 renders moot the prior art rejections set forth in the last Office Action (10/10/06), sections 2 and 3. However, the said prior art rejections are also applied to new claims 45-72 as set forth below.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 45-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 2000-160432 issued to Aikawa.

Aikawa discloses superfine fibers and a nonwoven made therefrom (English abstract). The superfine fibers are high melting point polypropylene fibers having a diameter of less than or equal to 5 microns and are made from island-in-the-sea composite filaments (abstract). When the fiber is made into a nonwoven fabric by a wet-laid method, the fiber length may be about 0.5-

Art Unit: 1771

30 mm (English translation, section [0019]). The island-in-the-sea composite fibers may contain a third component such as a low melting point fiber, such as polyethylene or a polypropylene copolymer (section [0013] - [0015]). Said nonwoven may incorporate other natural and synthetic fibers such as polyethylene or polypropylene fibers (section [0026]). Additionally, said other fibers may comprise composite fibers of two or more polymers such as a bicomponent fiber having adhesive properties or a bicomponent splittable fiber (e.g., island-in-the-sea) (section [0026]). Said nonwoven is suited for use as a filter media particularly as a separator for battery cells (section [0029]). The exemplary nonwovens are uniform without fiber lumps (section [0032] and [0034]). Example 3 of the reference teaches an island-in-the-sea fiber comprising islands of 40% polypropylene core and 60% high density polyethylene sheath (sections [0037] – [0038]). Example 4 provides a nonwoven suitable for a filter separator comprising the sheath-core fine island fiber of Example 3 blended with additional adhesive fibers comprising a low melting, high density polyethylene sheath and a high melting polypropylene core (sections [0039] – [0040]).

Thus, Aikawa teaches the limitations of claims 46 and 47 with the exception of (a) the high modulus fiber of high crystalline polypropylene alone or having a sheath of polyethylene, (b) the claimed thickness, and (c) the claimed properties of apparent total surface area of the fibers, uniformity index, and Young's modulus. Regarding the first exception, Aikawa teaches the fine island fibers of high melting point polypropylene are highly crystalline polypropylene (sections [0005] and [0008]). Since the fine fibers of Aikawa are also considered high modulus fibers themselves due to their high crystallinity, the reference teaches the presently claimed two fiber types in a single fiber. Note applicant's claims do not necessarily exclude the high modulus

fibers from also being fine island fibers or vice versa. Therefore, the first exception is met by the teachings of the reference.

Alternatively, upon limiting the claim to containing two separate fiber types, the first exception is inherent or obvious over the cited prior art. Recall that Aikawa teaches other fibers having adhesive properties can be blended with the fine fibers. These other fibers may be a sheath-core fiber comprising a high melting polypropylene core and a low melting polyethylene sheath (Example 4, sections [0039] – [0040]). Hence, the reference teaches two fibers types, one being a fine island fiber and the other being an adhesive fiber that is also inherently or obviously high modulus. In the event that the exemplary high melting polypropylene core of the adhesive fiber is not inherently high modulus, it would have been readily obvious to one skilled in the art to select a polypropylene for the core that has a greater melting point, crystallinity, and modulus. Note Aikawa teaches the high melting polypropylene fiber is high melting due to its high crystallinity, which would also correlate to a high modulus. Therefore, the first exception is inherent or obvious over the cited prior art.

With respect to the second exception of claimed thickness, it is argued that the thickness would have been readily obvious to one of ordinary skill in the art. Specifically, it would have been obvious to one skilled in the art to employ a nonwoven thickness in the amount recited by applicant, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. *In re Aller*, 105 USPQ 233. The thickness of the nonwoven can readily be determined based upon the intended use of a battery separator and limited by the fineness of the fibers employed in said nonwoven.

Regarding the third exception of claimed apparent total surface area of the fibers, uniformity index, and Young's modulus, these recited properties are not explicitly taught by the cited Aikawa reference. However, it is reasonable to presume that said properties would be present in the Aikawa invention when modified by the desired nonwoven thickness and/or polypropylene adhesive fiber. Support for said presumption is found in the use of like materials and like processes for making the nonwoven fabric. Products of identical composition cannot have mutually exclusive properties. *In re Spada*, 15 USPQ2d 1655. In the alternative, it would have been readily obvious to one skilled in the art to manipulate the fiber composition and crystallinity to improve the Young's modulus and to manipulate the fiber length and cross-sectional shape and size and the nonwoven density to improve the total surface area of the fibers and the uniformity index. It has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 205 USPQ 215. Therefore, claims 46 and 47 are rejected as being obvious over the cited prior art.

Regarding independent claim 45, which limits the high modulus fiber to ultra high molecular weight polyethylene (UHMWPE), Aikawa fails to teach said polyethylene. However, selection of said polyethylene would have been obvious over Aikawa's teachings of HDPE and high crystalline polypropylene. Specifically, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use. *In re Leshin*, 125 USPQ 416. One would be motivated to select UHMWPE for its toughness and high performance properties, including high melting point and high modulus. Therefore, claim 45 is also rejected.

Independent claims 59-61 differ from claims 45-47 in that the fine fibers are not limited to being made from island-in-the-sea composite fiber. Additionally, claims 59-61 limit the nonwoven fabric to consisting essentially of polyolefin-based fibers. Since Aikawa exemplifies nonwovens made of polyethylene and polypropylene fibers (e.g., Examples 3 and 4), claims 59-61 are also rejected.

Claims 48, 49, 62, and 63 are rejected along with claims 45, 46, 59, and 60 since Aikawa clearly teaches the use of fusible fibers in the nonwoven.

Regarding claims 50-52 and 64-66, the adhesive fiber of Example 4 has a fiber diameter of 11.8 microns while the fine fiber has a diameter of 1.2 microns (sections [0039] – [0040]). This meets applicant's claim limitation of a high modulus (adhesive fiber) average diameter that is five times or more than the average fiber diameter of the fine fibers. Hence, claims 50-52 and 64-66 are rejected. Similarly, the adhesive fiber of Example 4 has a fiber length of 10 mm while the fine fiber has a length of 3 mm (sections [0039] – [0040]). This meets applicant's claim limitation of a high modulus (adhesive) average fiber length that is 2.5 times or more than the average fiber length of the fine fibers. Therefore, claims 53-55 and 67-69 are also rejected.

Regarding claims 56-58 and 70-72, wherein the maximum pore size of the nonwoven is limited, it is argued that these claims are also obvious over the cited prior art. Specifically, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 205 USPQ 215. The maximum pore size of the nonwoven is dependent upon at least the fiber diameters and lengths and nonwoven density. Since the cited prior art teaches the same fiber diameters and lengths, as well as the same end application of a battery separator, the claimed maximum pore size is held to be obvious over said prior art.

Optimization of the fiber diameter and length and nonwoven density are within the level of ordinary skill in the art. Therefore, claims 56-58 and 70-72 are rejected as obvious over the prior art.

### *Conclusion*

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

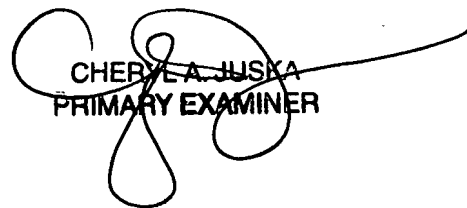
6. A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cheryl Juska whose telephone number is 571-272-1477. The examiner can normally be reached on Monday-Friday 10am-6pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel Morris can be reached at 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Art Unit: 1771

8. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
CHERYL A. JUSKA  
PRIMARY EXAMINER

cj  
May 22, 2007